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Date: April 14, 2009 /Luke Clossman/
Luke Clossman

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:

Appellant(s):	Chakravarty, et al.	Examiner:	Rhonda L. Murphy
Serial No:	10/788,729	Art Unit:	2616
Filing Date:	February 26, 2004	Conf. No:	6099

Title: SUPPRESSING CROSS-POLARIZATION INTERFERENCE IN AN ORTHOGONAL COMMUNICATION LINK

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Dear Sir:

Appellant submits this brief in connection with an appeal of the above-identified patent application. It is believed that no payment is due because this Brief is in response to prosecution that was re-opened as a result of a prior Appeal Brief. In the event any additional fees are due, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1063 [QUALP825US].

I. Real Party in Interest (37 C.F.R. §41.37(c)(1)(i))

The real party in interest in the present appeal is Qualcomm Incorporated, the assignee of the present application.

II. Related Appeals and Interferences (37 C.F.R. §41.37(c)(1)(ii))

Appellants, appellants' legal representative, and/or the assignee of the present application are not aware of any appeals or interferences which may be related to, will directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims (37 C.F.R. §41.37(c)(1)(iii))

Claims 1-15, 17, 18, and 20-30 stand rejected by the Examiner. Claims 16 and 19 have been canceled. The rejection of claims 1-15, 17, 18, and 20-30 is being appealed.

IV. Status of Amendments (37 C.F.R. §41.37(c)(1)(iv))

All amendments have been entered.

V. Summary of Claimed Subject Matter (37 C.F.R. §41.37(c)(1)(v))

In one embodiment of the claimed subject matter (independent claim 1), Appellants claim a method (Fig. 4) for use in encoding first and second nominally orthogonal polarization signals with a same long code (page 7, paragraph 0035, and Fig. 2) and transmitting the long-encoded first and second nominally orthogonal polarization signals from respective first and second transmission sources to at least one destination (page 7, paragraph 0038, and Fig. 2).

In another embodiment (independent claim 8), the claimed subject matter comprises a method (Fig. 4) of demodulating first and second nominally orthogonal polarization signals that were transmitted from respective first and second transmission sources after having been encoded with a same long code, the method comprising: receiving the encoded first and second nominally orthogonal polarization signals (page 8, paragraph 0049, and Fig. 3), and applying the same long code to the received encoded first and second nominally orthogonal polarization signals (page 7, paragraph 0051 and page 9, paragraph 0053, and Fig. 3).

In another embodiment (independent claim 21, a means plus function claim), the claimed subject matter comprises a transmission system comprising means (Fig. 2, elements 221 and 222)

for encoding both first and second nominally orthogonal polarization signals with a same long code (page 6-7, paragraph 0034, and Fig. 2); first means (Fig. 2, antenna 111) for transmitting the long-encoded first nominally orthogonal polarization signal from a first source (Fig. 2, terminal 110) to at least one destination (page 7, paragraphs 0036-0038, and Fig. 2); and second means (Fig. 2, antenna 121) for transmitting the long-encoded second nominally orthogonal polarization signal from a second transmission source to at least one destination (page 7, paragraphs 0036-0038, and Fig. 2).

In yet another embodiment (independent claim 26, a means plus function claim), the claimed subject matter comprises means (Fig. 3, antenna 151) for receiving the encoded first and second nominally orthogonal polarization signals (page 8, paragraph 0049, and Fig. 3) and means (Fig. 3, elements 320l, 320r, 321, and 323) for applying the same long code to the received encoded first and second nominally orthogonal polarization signals (page 7, paragraph 0051 and page 9, paragraph 0053, and Fig. 3).

VI. Grounds of Rejection to be Reviewed (37 C.F.R. §41.37(c)(1)(vi))

A. Whether claims 1, 8, 12-15, 17, 18, 20, 21, 26, 29, and 30 are unpatentable over Shou *et al.* (US 6,038,250) in view of Ibanez-Meier *et al.* (US 5,898,362), under 35 U.S.C. §103(a). Claims 1, 8, 12-15, 17, 18, 20, 21, 26, 29, and 30 stand rejected under 35 U.S.C. §103(a) .

B. Whether claims 2-7, 9-11, 22-25, 27, and 28 are unpatentable over Shou *et al.* and Ibanez-Meier as applied to claims 1 and 21 above, further in view of Hwang *et al.* (US 2002/0115473), under 35 U.S.C. §103(a). Claims 2-7, 9-11, 22-25, 27, and 28 stand rejected under 35 U.S.C. §103(a).

VII. Argument (37 C.F.R. §41.37(c)(1)(vii))

A. Rejection of Claims 1, 8, 12-15, 17, 18, 20, 21, 26, 29, and 30 Under 35 U.S.C. §103(a)

Claims 1, 8, 12-15, 17, 18, 20, 21, 26, 29, and 30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Shou *et al.* (US 6,038,250) in view of Ibanez-Meier *et al.* (US 5,898,362). Regarding claims 1, 15, 18, and 21, it was alleged that Shou *et al.* discloses a transmission method comprising: encoding both first and second nominally orthogonal

polarization signals with a same long code in Figure 3 (signals supplied to multipliers 16 and 17), in column 7, lines 50-54, and in column 6, lines 24-32. It was further alleged that Shou *et al.* teaches transmitting the long-encoded first and second nominally orthogonal polarization signals to at least one destination via output circuit 26. However, it was admitted that Shou *et al.* fails to teach transmitting the signals from respective first and second transmission sources. Finally, it was alleged that Ibanez-Meier *et al.* teaches transmitting the signals from respective first and second transmission sources and that it would have been obvious for one skilled in the art to combine the two references to arrive at Appellants' claimed subject matter.

Appellants do not believe that Shou *et al.* teaches a transmission method, system, or computer program product comprising "encoding both first and second nominally orthogonal polarization signals with a same long code" as recited in claims 1, 15, 18, and 21.

First and foremost, Shou *et al.* fails to teach or suggest a *transmission* method, system, or computer program product at all. Shou *et al.* teaches a *receiver*, not a transmitter. Figure 3, referred to in the Office Action of August 8, 2008, illustrates a block diagram of a "signal reception circuit" of a mobile station. Likewise, Shou *et al.* discusses elements of a *receiver* in column 7, lines 50-54, and in column 6, lines 24-32. Appellants' claims, on the other hand, are drawn to a method of transmission, a transmitter, or the like.

Second, Shou *et al.* fails to teach or suggest "encoding both first and second nominally orthogonal polarization signals with a same long code" as claimed by Appellants. It was alleged that Shou *et al.* teaches this feature in Figure 3 (signals supplied to multipliers 16 and 17), in column 7, lines 50-54, and in column 6, lines 24-32. As mentioned above, Figure 3 illustrates a block diagram of a receiver, not a transmitter. The signals being applied to multipliers 16 and 17 are not long codes. Rather, they are simply a cosine waveform and a sine waveform generated by oscillator 14 and applied to mixers 16 and 17 to shift the received In-phase (I) and Quadrature (Q) signals to baseband. This process is disclosed in column 5, line 62 through column 6, line 10. There is no mention that the signals are long codes or that the received signals are being "encoded". For these reasons alone, the rejection to claims 1, 15, 18, and 21 should be withdrawn because Shou *et al.* fails to teach the encoding of two nominally orthogonal polarization signals with a same long code.

Third, Shou *et al.* fails to teach encoding "first and second *nominally orthogonal polarization signals*' by a same long code. There is no mention in Shou *et al.* whatsoever of two

signals being orthogonally polarized to each other, i.e., the direction in which an electrical field of an electro-magnetic field propagates. An example of polarization that is well known in the art includes left and right polarization of two transmission signals, commonly used in satellite communication systems.

Finally, it was alleged that Shou *et al.* teaches transmitting the long-encoded first and second nominally orthogonal polarization signals to at least one destination via output circuit 26. Appellants do not believe that output circuit 26 is a transmitter, transmission circuit, or the like and, therefore, Shou *et al.* fails to teach transmitting the long-encoded first and second nominally orthogonal polarization signals to at least one destination. Output circuit 26 is described as follows:

> "Rake synthesizer 25 synthesizes…the phase-corrected output of each path…and outputs the synthesized output to the output circuit 26. The output of the output circuit 26 is *supplied* to a subsequent decision circuit or the like not shown in the drawing, which de-modulates and processes the signal." (*Shou et al., column 6, lines 38-45*)

Appellants do not consider *supplying* a signal from output circuit 26 to a subsequent decision circuit is the equivalent of *transmitting* a signal to at least one destination.

For all of the reasons stated above, Shoe *et al.* fails to teach or suggest a transmission method, system, or computer program product that "encod[es] both first and second nominally orthogonal polarization signals with a same long code". Therefore, the combination of Shou *et al.* fails to teach each and every element of Appellants' claimed subject matter, and the rejections to claims 1, 15, 18, and 21 should be withdrawn.

Regarding claims 8 and 26, it was alleged that Shou *et al.* teaches a method of demodulating first and second nominally orthogonal polarization signals in column 6, lines 40-45 comprising: receiving encoded first and second nominally orthogonal polarization signals (in column 6, lines 40-45) and applying the same long code to the first and second nominally orthogonal polarization signals (in column 6, line 61 to column 7, line 10). It was admitted that Shou *et al.* fails to explicitly teach transmitting the signals from respective first and second transmission sources, but that Ibanez-Meier teaches this feature in Figure 1 (users 30 and 40).

Therefore, it was alleged that one skilled in the art would have combined the cited references to arrive at Appellants' claimed subject matter.

Appellants do not believe that Shou *et al.* teaches "receiving encoded first and second nominally orthogonal polarization signals" in column 6, lines 40-45, or anywhere else in Shou *et al.* Column 6, lines 40-45, describe rake receiver 25 that synthesizes the output of each path received from phase correction means 24 and supplies the synthesized output to output circuit 26. There is no mention of two nominally orthogonal polarization signals in this passage from Shou *et al.* Nor is there any mention of using orthogonally polarized signals anywhere in Shou *et al.* The two signals from phase correction means 24 are simply In-phase (I) and Quadrature (Q) signals typically used in BPSK modulation schemes. From Shou *et al.*:

> "The multiplier 16 multiplies the intermediate frequency signal received from the distributor 13 by the oscillation output received from the oscillator 14 and outputs a base band signal Ri which is an in-phase component (I component) and is output via a low-pass filter 62. The multiplier 17 multiplies the intermediate frequency signal received from the distributor 13 by the output (sin.omega.t) of the phase shift circuit 15, and outputs a base band signal Rq which is a quadrature component (Q component). In this way, the received signal is quadrature-detected." (*Shou et al., column 6, lines 1-10*)

From the above passage and related explanation, it is clear that Shou *et al.* fails to teach the use of nominally orthogonal polarization signals and, therefore, the combination of Shou *et al.* with Ibanez-Meier fails to teach or suggest every element of Appellants' claimed subject matter. For this reason alone, the rejection to claims 8 and 26 should be withdrawn.

In addition to failing to teach or suggest the above claim feature, neither Shoe *et al.* nor Ibanez-Meier teach or suggest applying a same long code to nominally orthogonal polarization signals, as claims 8 and 26 recite. It was alleged that Shou *et al.* teaches this feature in column 6, line 61 to column 7, line 10. Appellants respectfully disagree with this characterization of Shou *et al.*

The cited paragraphs from Shou *et al.* describe the block diagram of Figure 3. In particular, the functions of long code search circuit 27 and PN generator 19 are discussed with respect to how a mobile device transitions between base stations. As shown in Figure 3, long code search circuit 27 comprises a ***single output*** that is provided to PN generator 19. PN

generator, in turn, generates a ***short code*** that is supplied to complex-type matching filter 18, i.e., to the received I and Q signals. From Shou *et al.*:

> "The PN generator 19 is controlled by the long code synchronization timing determiner 4 and the long code identifier 6. At the time of the initial search, the ***PN generator 19 outputs the short code #0 that is common to the control channels of all base stations***. After the long code synchronization timing has been determined, each segment having N chips, which is a portion of the spread code sequence synthesized from the short code #0 and one of the long codes #i unique to each base station, is sequentially loaded and output." (*Shou et al., column 6, line 61 to column 7, line 1, emphasis added*)

From the above cited passage and accompanying explanation, it is clear that Shou *et al.* does not teach a long code being applied to two nominally orthogonal polarization signals. Ibanez-Meier, likewise, fails to teach such a feature. Therefore, because neither Shou *et al.* nor Ibanez-Meier teach applying a long code to two nominally orthogonal polarization signals, the rejections to claims 8 and 26 under 35 U.S.C. §103(a) should be withdrawn. Appellants further assert that claims 12-14, 17, 20, 29, and 30 are likewise allowable as being dependent upon allowable claims, namely claims 8 and 26.

B. Rejection of Claims 2-7, 9-11, 22-25, 27, and 28 Under 35 U.S.C. §103(a)

Claims 2-7, 9-11, 22-25, and 28 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Shou *et al.* and Ibanez-Meier as applied to claims 1 and 21 above, and further in view of Hwang *et al.* (US 2002/0115473). It was alleged that Shou *et al.* and Ibanez-Meier teach all of the elements of claims 1 and 21, and that one skilled in the art would have combined these two references with Hwang *et al.* to obviate each of the above-cited claims.

Appellants do not believe that the combination of Shou *et al.* and Ibanez-Meier teach or suggest all of the claim features of claims 1 and 21, as explained above in section **VII(A)** of this brief . Therefore, Appellants believe that claims 2-7, 9-11, 22-25, 27, and 28 are likewise allowable as being dependent on allowable claims, namely claims 1 and 21. Accordingly, Appellants request that the rejections to these claims be reversed.

C. <u>Conclusion</u>

For at least the above reasons, the claims currently under consideration are believed to be patentable over the cited references. Accordingly, it is respectfully requested that the rejections of claims 1-15, 17, 18, and 20-30 be reversed.

If any additional fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [QUALP825US].

Respectfully submitted,
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VIII. Claims Appendix (37 C.F.R. §41.37(c)(1)(viii))

1. (Original) A transmission method, comprising:

encoding both first and second nominally orthogonal polarization signals with a same long code; and

transmitting the long-encoded first and second nominally orthogonal polarization signals from respective first and second transmission sources to at least one destination.

2. (Original) The method of Claim 1, further comprising:

orthogonalizing plural sub-channels of each of the first and second nominally orthogonal polarization signals by applying respective plural mutually distinct Walsh codes in each sub-channel.

3. (Original) The method of Claim 2, wherein the orthogonalizing step includes: applying different Walsh codes to different respective signals originating from different respective users of the communication system.

4. (Original) The method of Claim 3, wherein:

the transmitting step is carried out in an orthogonal code division multiple access (OCDMA) communications system.

5. (Original) The method of Claim 1, wherein:

the transmitting step is carried out in an orthogonal code division multiple access (OCDMA) communications system.

6. (Original) The method of Claim 1, wherein the transmitting step includes:

transmitting the long-encoded first and second nominally orthogonal polarization signals from plural first transmission sources and from plural second transmission sources, respectively, to the at least one destination.

7. (Original) A communication method including the transmission method of Claim 1 and further comprising:

at the destination, receiving the encoded first and second nominally orthogonal polarization signals; and

applying the same long code to the received encoded first and second nominally orthogonal polarization signals received at the destination.

8. (Original) A method of demodulating first and second nominally orthogonal polarization signals that were transmitted from respective first and second transmission sources after having been encoded with a same long code, the method comprising:

receiving the encoded first and second nominally orthogonal polarization signals; and

applying the same long code to the received encoded first and second nominally orthogonal polarization signals.

9. (Original) The method of Claim 8, further comprising:

separating plural sub-channels within each of the first and second nominally orthogonal polarization signals by applying respective plural mutually distinct Walsh codes in each sub-channel.

10. (Original) The method of Claim 9, wherein the separating step includes:

applying different Walsh codes to different respective signals originating from different respective users of the communication system.

11. (Original) The method of Claim 10, wherein:

the receiving step is carried out in an orthogonal code division multiple access (OCDMA) communications system.

12. (Original) The method of Claim 8, wherein:

the receiving step is carried out in an orthogonal code division multiple access (OCDMA) communications system.

13. (Original) A communication method including the demodulating method of Claim 8 and further comprising:

encoding both the first and second nominally orthogonal polarization signals with the same long code; and

transmitting the long-encoded first and second nominally orthogonal polarization signals from respective first and second transmission sources to at least one destination at which the demodulating method is performed.

14. (Original) The method of Claim 13, wherein the transmitting step includes:

transmitting the long-encoded first and second nominally orthogonal polarization signals from plural first transmission sources and from plural second transmission sources, respectively, to the at least one destination.

15. (Original) A computer program product storing program instructions for execution on a computer system having at least one data processing device, whose instructions when executed by the computer system cause the computer system to perform the method of Claim 1.

16. (Cancelled)

17. (Original) A computer program product storing program instructions for execution on a computer system having at least one data processing device, whose instructions when executed by the computer system cause the computer system to perform the method of Claim 8.

18. (Original) A system configured to perform the method of Claim 1.

19. (Cancelled)

20. (Original) A system configured to perform the method of Claim 8.

21. (Original) A transmission system comprising:

means for encoding both first and second nominally orthogonal polarization signals with a same long code;

first means for transmitting the long-encoded first nominally orthogonal polarization signal from a first source to at least one destination; and

second means for transmitting the long-encoded second nominally orthogonal polarization signal from a second transmission source to at least one destination.

22. (Original) The system of Claim 21, further comprising:

means for orthogonalizing plural sub-channels of each of the first and second nominally orthogonal polarization signals by applying respective plural mutually distinct Walsh codes in each sub-channel.

23. (Original) The system of Claim 22, wherein the orthogonalizing means includes: means for applying different Walsh codes to different respective signals originating from different respective users of the communication system.

24. (Original) The system of Claim 21, wherein the first and second transmitting means include:

means for transmitting the long-encoded first and second nominally orthogonal polarization signals from plural first transmission sources and from plural second transmission sources, respectively, to the at least one destination.

25. (Original) A communication system including the transmission system of Claim 21 and further comprising:

means for receiving the encoded first and second nominally orthogonal polarization signals; and

means for applying the same long code to the received encoded first and second nominally orthogonal polarization signals received at the destination.

26. (Original) A system for demodulating first and second nominally orthogonal polarization signals that were transmitted from respective first and second transmission sources after having been encoded with a same long code, the system comprising:

means for receiving the encoded first and second nominally orthogonal polarization signals; and

means for applying the same long code to the received encoded first and second nominally orthogonal polarization signals.

27. (Original) The system of Claim 26, further comprising:

means for separating plural sub-channels within each of the first and second nominally orthogonal polarization signals by applying respective plural mutually distinct Walsh codes in each sub-channel.

28. (Original) The system of Claim 27, wherein the separating means includes: means for applying different Walsh codes to different respective signals originating from different respective users of the communication system.

29. (Original) A communication system including the demodulating system of Claim 26 and further comprising:

means for encoding both the first and second nominally orthogonal polarization signals with the same long code;

first means for transmitting the long-encoded first nominally orthogonal polarization signal from a first transmission source to at least one destination; and

second means for transmitting the long-encoded second nominally orthogonal polarization signal from a second transmission source to at least one destination.

30. (Original) The system of Claim 29, wherein the first and second transmitting means include:

means for transmitting the long-encoded first and second nominally orthogonal polarization signals from plural first transmission sources and from plural second transmission

sources, respectively, to the at least one destination.

IX. Evidence Appendix (37 C.F.R. §41.37(c)(1)(ix))

None.

X. Related Proceedings Appendix (37 C.F.R. §41.37(c)(1)(x))

None.